

WHAT IS CLAIMED IS:

1. A method of increasing the fabric protective properties of a fabric that comprises the steps of:

- (a) depositing a composition onto the fabric wherein the composition comprises a hydrophobic agent having a melting point or glass transition temperature of less than 100°C; and
- (b) curing said fabric at a temperature above ambient temperature and less than 100 °C.

2. The method of claim 1 wherein the composition further includes a fluoropolymer.

3. The method of claim 1 or 2 wherein the composition further includes an effective amount of a zeta potential modifier so that the composition has a zeta potential that is positive and greater than zero millivolts

4. The method of claim 3 wherein the composition has a zeta potential of less than about +150 millivolts.

5. The method of claim 3 wherein the composition has a zeta potential of less than about +100 millivolts.

6. The method of claim 1 wherein the composition further includes a liquid carrier comprising an aqueous solvent, non-aqueous solvent, and mixtures thereof.

7. The method of claim 6 wherein said aqueous solvent comprises water.

8. The method of claim 6 wherein said non-aqueous solvent comprises a low molecular weight organic solvent, a monohydric alcohol, a polyhydric alcohol, a glycol, a glycol ether, and mixtures thereof.

5 9. The method of claim 1 wherein said step (a) is achieved through the use of one or more of a dispensing device, a bottle, a spray bottle, a dosing container, a water soluble or water insoluble sachet, a water soluble or water insoluble package, a spray or aerosol producing device, an absorbent matrix, a motion-powered, heat-powered, battery-powered or mechanically-powered dispensing
10 device, an ironing device with liquid reservoir, any one of which initially retains and subsequently releases said composition so as to provide deposition of said composition onto said fabric.

15 10. The method of claim 1 wherein said steps (a) and (b) are achieved simultaneously.

11. The method of claim 10 wherein said steps occur simultaneously within the drum of a dryer machine.

20 12. The method of claim 1 wherein step (b) comprises drying the fabric at a temperature above about 45°C and less than 100°C.

25 13. The method of claim 1 wherein said step (b) is achieved by first drying the fabric at around ambient temperature, followed by heating the fabric to a temperature above ambient temperature and less than 100 °C.

14. The method of claim 1 wherein said step (b) is achieved by use of any one of an iron, a heat lamp, a radiator, heated air, an infrared heat source, a microwave source, steam, a steam press, heated water vapor, a blow dryer, a tumble dryer, a

garment refresher device, a heating device, and any combination thereof, and in any order of use thereof.

5 15. The method of claim 1 wherein said step (a) saturates said fabric with said composition.

16. The method of claim 1 wherein said step (a) uniformly coats the surface of said fabrics without saturating said fabric.

10 17. The method of claim 1 wherein said composition further comprises an additive selected from the group consisting of emulsifiers, pH adjusters, silicones, non-ionic surfactants, cationic surfactants, amphoteric surfactants, zwitterionic surfactants, anionic surfactants, soil release agents, soil release polymers, antistatic agents, fragrances, fragrance extenders, antimicrobial actives,
15 preservatives, dyes, colorants, viscosity control agents, antifoaming agents, pearlizing agents, opacifying agents, antioxidants, sunscreens, dye transfer inhibitors, dye fixative agents, dispersants, chlorine scavengers, wetting agents, electrolytes, enzymes, bleaching agents, brighteners, heavy metal chelating agents, fabric softener actives, soil suspending agents, soil release agents, and
20 mixtures thereof.

18. The method of claim 1 wherein the fabric is selected from the group consisting of natural fibers, synthetic fibers, and mixtures thereof.

25 19. The method of claim 18 wherein the natural fibers comprise cellulose, cotton, wool and fur and mixtures thereof.

20. The method of claim 18 wherein the natural fibers comprise cotton.

21. The method of claim 18 wherein the synthetic fibers are selected from the group consisting of polyester, polyamide, nylon and mixtures thereof.

5 22. The method of claim 1 wherein said hydrophobic agent is 0.5 to 60 weight % of the composition.

23. The method of claim 1 wherein said hydrophobic agent is at least partly insoluble in water at a temperature of about 20 °C.

10 24. The method of claim 1 or 23 wherein said hydrophobic agent is selected from the group consisting of hydrophobic waxes, polymers produced from ethylenically unsaturated monomers, low molecular weight polyethylene, low density polyethylene, polypropylene, oxidized polyethylene, oxidized polypropylene, polyolefin, polyurethane, ethyl vinyl acetate, polyvinyl chloride, 15 co-polymers, and emulsifiable waxes.

25. The method of claim 6 wherein said liquid carrier is an aqueous solvent which is between 10 weight % and 90 weight % of the composition.

20 26. The method of claim 6 wherein said liquid carrier is a non-aqueous solvent which is between 10 weight % and 90 weight % of the composition.

27. The method of claim 2 wherein said fluoropolymer is 0.1 to 60 weight % of the composition.

25 28. The method of claim 3 wherein said zeta potential modifier is 0.1 to 30 weight % of the composition.

29. The method of claim 3 wherein said zeta potential modifier is a cationic material.

30. The method of claim 29 wherein said cationic material is a cationic surfactant
 5 selected from the group consisting of mono and di-methyl fatty amines, alkyl trimethyl ammonium salts, dialkyl dimethyl ammonium salts, alkyl amine acetates, trialkylammonium acetates, alkyldimethylbenzyl ammonium salts, dialkylmethylbenzyl ammonium salts, alkylpyridinium halide and alkyl (alkyl substituted) pyridinium salts, alkylthiomethylpyridinium salts,
 10 alkylamidomethylpyridinium salts, alkylquinolinium salts, alkylisoquinolinium salts, N,N-alkylmethylpyrrolidinium salts, 1,1-dialkylpiperidinium salts, 4,4-dialkylthiomorpholinium salts, 4,4-dialkylthiomorpholinium-1-oxide salts, methyl bis (alkyl ethyl)-2-alkyl imidazolinium methyl sulfate (and other salts), methyl bis(alkylamido ethyl)-2-hydroxyethyl ammonium methyl sulfate (and
 15 other salts), alkylamidopropyl-dimethylbenzyl ammonium salts, carboxyalkyl-alkyldimethyl ammonium salts, alkylamine oxides, alkyldimethyl amine oxides, poly(vinylmethylpyridinium) salts, poly(vinylpyridine) salts, polyethyleneimines, trialkyl phosphonium bicarbonates (and other salts), trialkylmethyl phosphonium salts, alkylethylmethysulfonium salts, and
 20 alkyldimethylsulfoxonium salts.

31. The method of claim 29 wherein said cationic material is selected from the group consisting of cationically modified materials including cationically modified organic polymers, biopolymers, clays, silicas, nanoparticles, and
 25 mixtures thereof.

32. The method of claim 2 wherein the composition further comprises an additive selected from the group consisting of emulsifiers, pH adjusters, silicones, non-ionic surfactants, cationic surfactants, amphoteric surfactants, zwitterionic

surfactants, anionic surfactants, soil release agents, soil release polymers, antistatic agents, fragrances, fragrance extenders, antimicrobial actives, preservatives, dyes, colorants, viscosity control agents, antifoaming agents, pearlizing agents, opacifying agents, antioxidants, sunscreens, dye transfer inhibitors, dye fixative agents, dispersants, chlorine scavengers, wetting agents, electrolytes, enzymes, bleaching agents, brighteners, heavy metal chelating agents, fabric softener actives, soil suspending agents, soil release agents, and mixtures thereof.

10 33. The method of claim 2 wherein the composition comprises: (i) 0.1 to 60 weight% of said fluoropolymer; and (ii) 0.5 to 60 weight % of said hydrophobic agent.

15 34. The method of claim 33 wherein the composition further comprises 10 to 90 weight % of a liquid carrier.

20 35. The method of claim 3 wherein the composition comprises: (i) 0.1 to 60 weight% of said fluoropolymer; (ii) 0.5 to 60 weight % of said hydrophobic agent; and (iii) 0.1 to 30 weight % said zeta potential modifier.

36. The method of claim 35 wherein the composition further comprises 10 to 90 weight % of a liquid carrier.

25 37. A method of increasing the water repellency properties of a fabric that comprises the steps of:

- (a) depositing a composition onto the fabric wherein the composition comprises a hydrophobic agent having a melting point or glass transition temperature of less than 100°C; and

(b) curing said fabric at a temperature above ambient temperature but less than 100 °C, wherein increasing the water repellancy of said fabric comprises increasing the initial water contact angle to an angle greater than 0 degrees.

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38. The method of claim 37 wherein said initial water contact angle is greater than 30 degrees.

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39. The method of claim 37 wherein said initial water contact angle is greater than 70 degrees.

40. The method of claim 37 wherein said initial water contact angle is greater than 100 degrees.

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41. A method of increasing the oil repellency properties of a fabric that comprises the steps of:

(a) depositing a composition onto the fabric wherein the composition comprises a hydrophobic agent having a melting point or glass transition temperature of less than 100°C, a fluoropolymer; and

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(b) curing said fabric at a temperature above ambient temperature but less than 100 °C, wherein increasing the oil repellancy of said fabric comprises increasing the initial oil contact angle to an angle greater than 0 degrees.

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42. The method of claim 41 wherein said initial oil contact angle is greater than 30 degrees.

43. The method of claim 41 wherein said initial oil contact angle is greater than 40 degrees.

44. The method of claim 41 wherein said initial oil contact angle is greater than 70 degrees.

5 45. The method of claim 1 wherein said fabric protective properties of the fabric are increased without effectively decreasing the breathability of said fabric.

46. The method of claim 45 wherein said breathability of the fabric is not decreased below about 0.40 Grams of Water in Column as measured by the breathability
10 test described herein.

47. The method of claim 2 wherein said fabric protective properties increased by said method comprise increasing both the initial water contact angle and the initial oil contact angle to angles both greater than 0 degrees.

15 48. The method of claim 47 wherein said initial water contact angle is greater than 30 degrees and said initial oil contact angle is greater than 30 degrees.

49. The method of claim 47 wherein said initial water contact angle is greater than
20 70 degrees and said initial oil contact angle is greater than 40 degrees.

50. The method of claim 47 wherein said initial water contact angle is greater than 100 degrees and said initial oil contact angle is greater than 70 degrees.

25 51. The method of claim 2 wherein said fabric protective properties further comprise improved handfeel, improved softness and improved resistance to damage.

52. The method of claim 2 wherein said fabric protective properties increased by said method comprise increasing soil, stain and particulate soil repellency, and combinations thereof.

5 53. The method of claim 2 wherein said fabric protective properties of the fabric are increased without effectively decreasing the breathability of said fabric.

54. The method of claim 53 wherein said breathability of the fabric is not decreased below about 0.40 Grams of Water in Column.

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55. A method of treating a fabric in a tumble dryer machine to increase the fabric protective properties of said fabric, comprising the steps of:

(a) depositing a composition onto the fabric wherein the composition comprises a hydrophobic agent having a melting point or glass transition temperature of less than 100°C; and

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(b) curing said fabric at a temperature above ambient temperature but less than 100 °C;

wherein said composition optionally includes a fluoropolymer, and wherein said fabric protective properties comprise increased water repellancy, increased oil repellancy, improved handfeel, improved softness, improved resistance to damage, and any combination thereof.

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56. The method of claim 55 wherein the composition further comprises a liquid carrier selected from the group consisting of an aqueous solvent, water, a non-aqueous solvent, a low molecular weight organic solvent, a monohydric alcohol, a polyhydric alcohol, a glycol, a glycol ether, and mixtures thereof.

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57. The method of claim 55 wherein said composition further comprises an additive selected from the group consisting of emulsifiers, pH adjusters, silicones, non-ionic surfactants, cationic surfactants, amphoteric surfactants, zwitterionic surfactants, anionic surfactants, soil release agents, soil release polymers, antistatic agents, fragrances, fragrance extenders, antimicrobial actives, preservatives, dyes, colorants, viscosity control agents, antifoaming agents, pearlizing agents, opacifying agents, antioxidants, sunscreens, dye transfer inhibitors, dye fixative agents, dispersants, chlorine scavengers, wetting agents, electrolytes, enzymes, bleaching agents, brighteners, heavy metal chelating agents, fabric softener actives, soil suspending agents, soil release agents, and mixtures thereof.

58. A kit for treating a fabric to increase the fabric protective properties comprising: (a) a composition; (b) a dispensing device for depositing said composition onto said fabric; and (c) instructions for treating said fabric, wherein said composition comprises a hydrophobic agent having a melting point or glass transition temperature of less than 100°C, and wherein said instructions include the steps of depositing said composition onto said fabric and curing said fabric at a temperature sufficient to effect a fabric protective benefit to said fabric.

59. The kit of claim 58 wherein said composition further comprises a fluoropolymer.

60. The kit of claim 58 wherein said composition further comprises a zeta potential modifier.

61. The kit of claim 58 wherein said dispensing device is selected from the group consisting of a spray bottle, a dosing container, a water soluble or water insoluble sachet, a water soluble or water insoluble package, a spray or aerosol

producing device, an absorbent matrix, a motion-powered, heat-powered, battery-powered or mechanically-powered dispensing device, an ironing device with liquid reservoir, any one of which provides release of the composition onto said fabric.

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62. The kit of claim 58 wherein said dispensing device operates within the drum of a tumble dryer machine to effectively dispense said treatment composition onto said fabric.

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63. The kit of claim 62 wherein said dispensing device may be used a plurality of times according to said instructions to treat a plurality of fabric articles.

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64. The kit of claim 62 wherein said dispensing device comprises a disposable dispensing container, an absorbent matrix, or combination thereof, wherein said dispensing device contains said composition, wherein said instructions include the step of using said dispensing device a single time to treat a plurality of fabric articles.

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65. The kit of claim 58 wherein said dispensing device is selected from the group consisting of an absorbent matrix releasably saturated with said treatment, a motion, heat, battery or mechanically powered dispensing device, a container with one or more dispensing orifices, a spray device, a dosing device, any one of which effectively dispenses said treatment composition onto said fabric during tumbling within the drum of a tumble dryer machine.

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66. The kit of claim 58 wherein said dispensing device is manually operated to effect dispensing of a spray, mist, aerosol, vapor or fine droplets of said composition onto said fabric.

67. The kit of claim 58 wherein said dispensing device is an absorbent matrix releasably saturated with said composition, wherein said instructions include the step of placing said absorbent matrix into the drum of a tumble dryer machine for treating said fabric.

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68. The kit of claim 58 wherein said composition further comprises an additive selected from the group consisting of emulsifiers, pH adjusters, silicones, non-ionic surfactants, cationic surfactants, amphoteric surfactants, zwitterionic surfactants, anionic surfactants, soil release agents, soil release polymers, antistatic agents, fragrances, fragrance extenders, antimicrobial actives, preservatives, dyes, colorants, viscosity control agents, antifoaming agents, pearlizing agents, opacifying agents, antioxidants, sunscreens, dye transfer inhibitors, dye fixative agents, dispersants, chlorine scavengers, wetting agents, electrolytes, enzymes, bleaching agents, brighteners, heavy metal chelating agents, fabric softener actives, soil suspending agents, soil release agents, and mixtures thereof.

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69. The kit of claim 58 wherein said composition further comprises a liquid carrier selected from the group consisting of an aqueous solvent, water, a non-aqueous solvent, a low molecular weight organic solvent, a monohydric alcohol, a polyhydric alcohol, a glycol, a glycol ether, and mixtures thereof.

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70. The kit of claim 58 wherein said instructions include the step of dispensing said composition into an internal reservoir of a treatment device that includes means to dispense said composition to effect treating of said fabric.

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71. The kit of claim 70 wherein said treatment device with internal reservoir and dispensing means is selected from the group consisting of a dryer, a tumble dryer, a garment refresher device, an ironing device, a fabric press, a steaming device and a hand held iron.